

WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

April 22, 2010

TO: Internal File

THRU: James D. Smith, Permit Supervisor *DS 04 May 10*

FROM: Steve Christensen, Environmental Scientist *SKC*

RE: 2009 Fourth Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #3447

The West Ridge Mine is currently operational in the Book Cliff Mountain range of Carbon County, UT. Water monitoring data is submitted quarterly to the Division EDI database. Beginning on page 7-34 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and UPDES outfalls in Tables 7-1, 7-2, 7-3 and 7-4 respectively.

1. Was data submitted for all of the MRP required sites? YES ☒ NO ☐

Springs

The approved MRP outlines the monitoring of 10 springs. Four of the springs (SP-12, SP-13, SP-15 and SP-16) discharge from the lower slopes of West Ridge in Whitmore Canyon. Two springs (WR-1 and WR-2) discharge from the upper slope of West Ridge in Whitmore Canyon. One spring (SP-8) discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80) is located near the northwest corner of the permit area and discharges from the east slopes of Whitmore Canyon. Spring 101 monitors Little Spring at the bottom of West Ridge. Spring 102 is located within Spring Canyon.

Data was submitted for all spring monitoring sites with measurable flow. Eight of the ten sites produced a measurable flow this quarter.

Streams

The approved MRP outlines the monitoring of 12 stream sites. Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. Operational sampling is required quarterly for six stream sites (ST-3, ST-8, ST-9, ST-10, ST-13 and ST-15). Sites ST-11 and ST-12

were added to the water-monitoring program based upon field inspections conducted in 2005. The field inspections were conducted as part of a proposed lease expansion by the Permittee. At the time of the inspections, the Bear Canyon drainage had exhibited measurable flow. As a precaution, sites ST-11 and ST-12 were established within that drainage. Since that time (summer of 2005) neither site has produced appreciable/measurable flow. However, the sites remain as part of the surface water monitoring program and are inspected quarterly.

Data was submitted for all stream-monitoring sites with measurable flow. Only four of the twelve stream monitoring sites produced a measurable flow this quarter.

Wells

Quarterly operational sampling is required for one groundwater-monitoring well (Site DH 86-2).

Monitoring well DH 86-2 was sampled during this quarter and all required data submitted.

UPDES

Operational sampling is required monthly for two active UPDES sites (Permit # UT0025640). Site D001 is the mine sites primary sediment pond discharge to the ephemeral 'C' Canyon drainage. Site D002 is the mine-water discharge to the ephemeral 'C' Canyon drainage. Specific limitations and self-monitoring requirements as outlined in the UPDES permit are presented in the table below:

Effluent Characteristics	Effluent Limitations
Flow, MGD (million gallons per day)	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.3
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,000
pH	9

The Permittee submitted all required samples per the terms of the UPDES discharge permit. Site 001 did not report a discharge for this quarter. Site 002 averaged a flow of 957.44 gpm.

2. Were all required parameters reported for each site? YES ☒ NO ☐

Surface Water Monitoring Sites: All required parameters were reported for sites with

measurable flow.

Groundwater and Well Monitoring Sites: All required parameters were reported for sites that measurable flow.

UPDES: Site D001 did not produce any discharge during this quarter. All required parameters were reported for Site D002.

3. Were any irregularities found in the data? YES ☒ NO ☐

Surface Water Monitoring Sites-

ST-5- Based upon field inspections, it's apparent that the majority (if not all) of the flow within this ephemeral drainage is produced from the mine-water discharge.

Flow values had been steadily rising at surface water monitoring site ST-5 until the 4th quarter of 2008. Since that time, the reported flow values have been decreasing erratically.

As the flow at this site is generated primarily from the mine-water discharge, particular attention has been paid to the TSS and T-Fe values. As discussed in detail below (UPDES Section), these two parameters have shown significant upward trends within the mine-water discharge. The reported TSS and T-Fe values for ST-5 this quarter decreased slightly. The cause for the fluctuations is unclear. The reported T-Fe value for site ST-5 this quarter is 0.733 ppm. The reported TSS value for site ST-5 this quarter is 28 ppm.

ST-6- As with site ST-5, the majority (if not all) of the flow within this drainage comes from the mine-water discharge.

ST-6 has historically produced erratic flow values. The previous quarter had reported a flow value of 134.64 gpm as compared to this quarters flow of 1,032.24 gpm.

Again, as with site ST-5, as the TSS and T-Fe levels in the mine-water discharge have steadily increased, particular attention has been paid on potential downstream impacts as a result. Site ST-6 is located less than ½ mile from the outlet of UPDES outfall D002 (mine-water discharge point) and as result, there is strong potential for increased TSS and T-Fe levels.

A non-compliant T-Fe value was reported during the 1st quarter of 2009 (1.301 ppm). Since that time, T-Fe concentrations at ST-6 have been relatively steady with reported values well within compliant levels as well as within two standard deviations from the mean.

TSS levels had been steadily increasing at site ST-6 the previous 5 quarters. However, this quarter produced a TSS concentration of 32 ppm.

Groundwater Monitoring Sites- Several irregularities were found in the reported groundwater monitoring data:

S-80 reported a dissolved potassium (D-K) value outside of two standard deviations. The mean of the data set is 2.88 ppm. The reported value for this quarter was 6.54 ppm. Continued monitoring will be conducted in order to ascertain if a trend is emerging.

SP-101- For the last three consecutive quarters, this spring has begun to exhibit upward trends in several parameters. Continued monitoring will be conducted to determine what may be causing the upward trend.

SP-102- The previous two quarters, the spring had reported elevated levels of bicarbonate. This quarter all required parameters were within two standard deviations of the mean.

SP-12- Several parameters were again reported outside of two standard deviations for the third consecutive quarter (D-Ca, D-Mg, SO₄, TDS, Bicarbonate, Total-Cations and Total Anions).

It's unclear as to what's causing this spike. When weather/access conditions allow, a field inspection of the spring should be conducted if the current trend continues.

SP-13- This spring monitoring site continues to exhibit upward trends for TDS and SO₄. For the 3rd consecutive quarter, the site has reported values outside of two standard deviations from the mean.

SP-16- D-Ca, TDS and Total hardness were reported outside of two standard deviations of the mean.

SP-8 For the third consecutive quarter Spring SP-8 reported TDS and D-Na concentrations outside of two standard deviations. It's unknown at this time what is causing the spike.

WR-1 reported three parameters beyond two standard deviations from the mean: T-Mn, water temperature and T-Fe the previous quarter. All required parameters were reported within two standard deviations.

Several springs within the West Ridge permit area have produced consecutive quarters of elevated concentrations of TDS and it's components (SP-8, SP-12, SP-101 and SP-13). It's unclear as to the cause of this upward trend. When weather/access conditions permit, a field visit may be conducted to gather additional information.

Monitoring Well DH 86-2 Several parameters were reported outside of two deviations for the previous quarter: D-K, Cl, T-Cats and T-Anions. All reported parameters were within two standard deviations of the mean for this quarter.

UPDES Sites- (UPDES Permit #UT0025640)

Site D001- UPDES outfall D001 (primary sediment pond at mine site) did not discharge this quarter.

Site D002- UPDES Outfall 002 has exhibited fluctuating levels of TSS and T-Fe historically. However, based upon four sampling events this quarter, the reported values for both TSS and T-Fe were well within the compliance levels as established in their UPDES discharge permit (70 ppm and 1.3 ppm respectively).

4. On what date does the MRP require a five-year re-sampling of baseline water data.

On page 7-35 of the approved MRP, the Permittee commits to collecting baseline samples *“from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring sites during low flow every five years beginning with the first mid-term review.”*

The Division initiated the last mid-term review on November 9th, 2006. As such, baseline sampling of ground and surface water sites will be required during the 3rd quarter of 2011.

5. Based on your review, what further actions, if any, do you recommend?

Continue to monitor the data irregularities cited above for any trends.

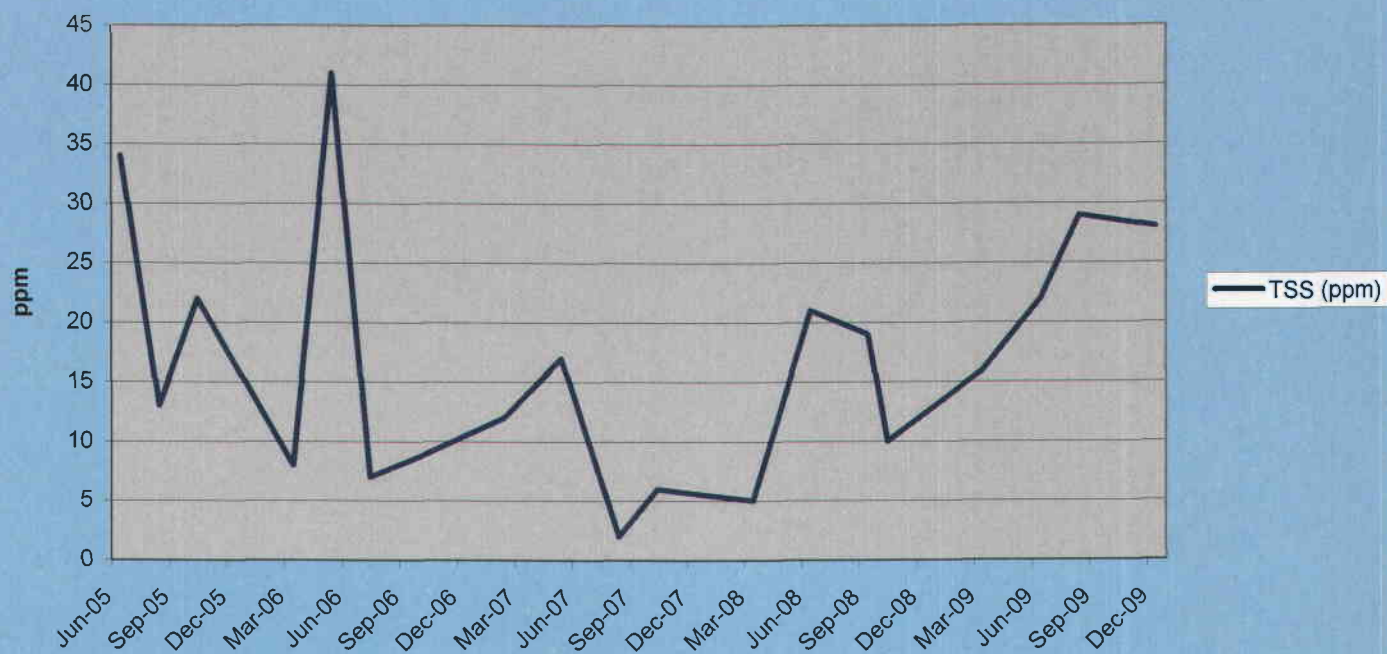
6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements?

YES ☐ NO ☒

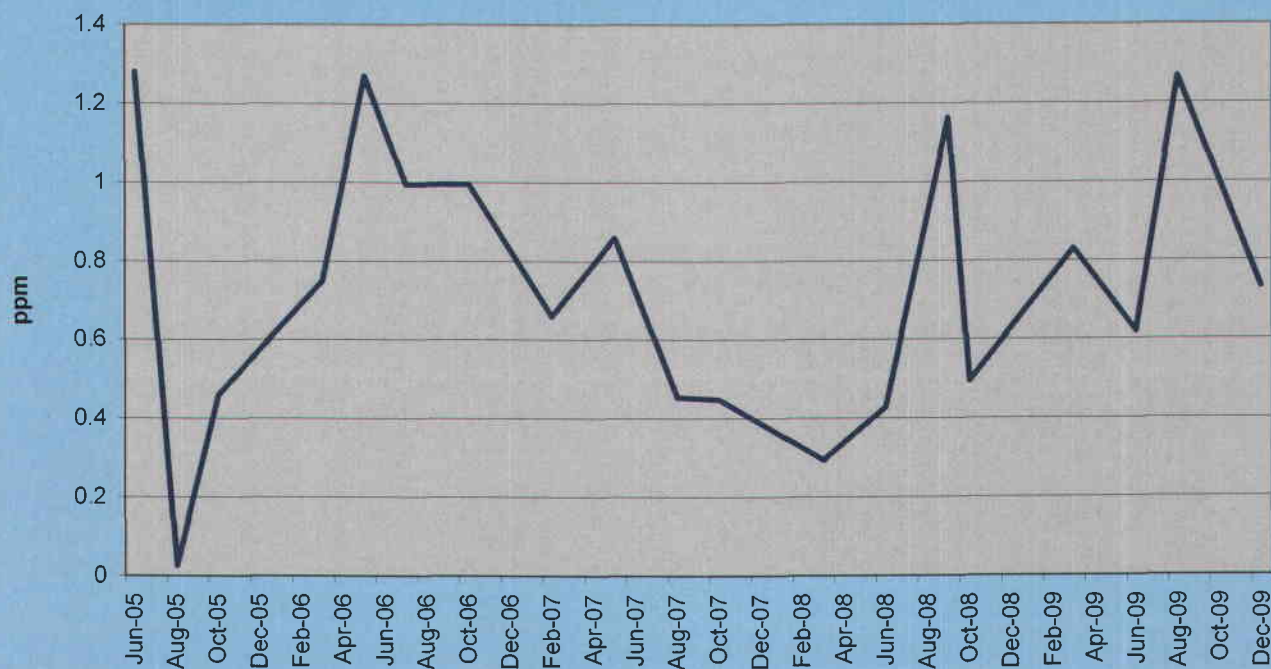
7. Follow-up from last quarter, if necessary. Did the Mine operator submit or provide an explanation for missing and/or irregular data?

YES ☐ NO ☒

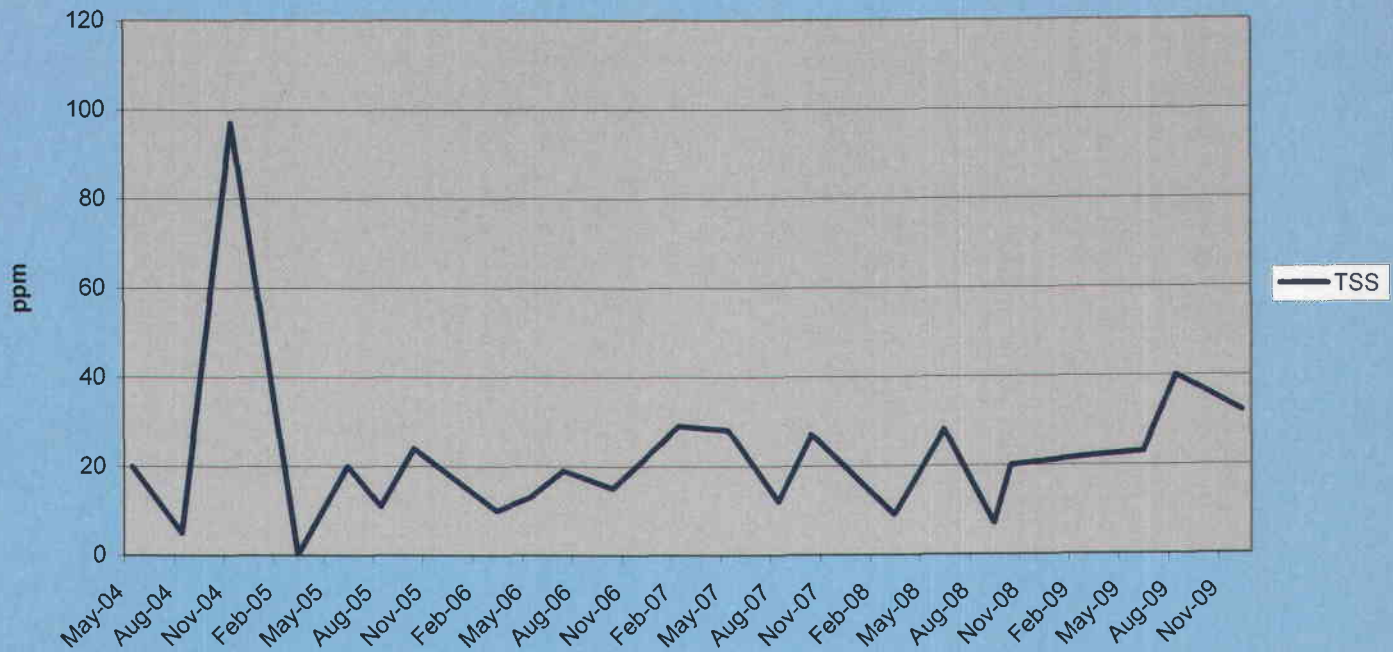
ST-5: TSS vs. Time



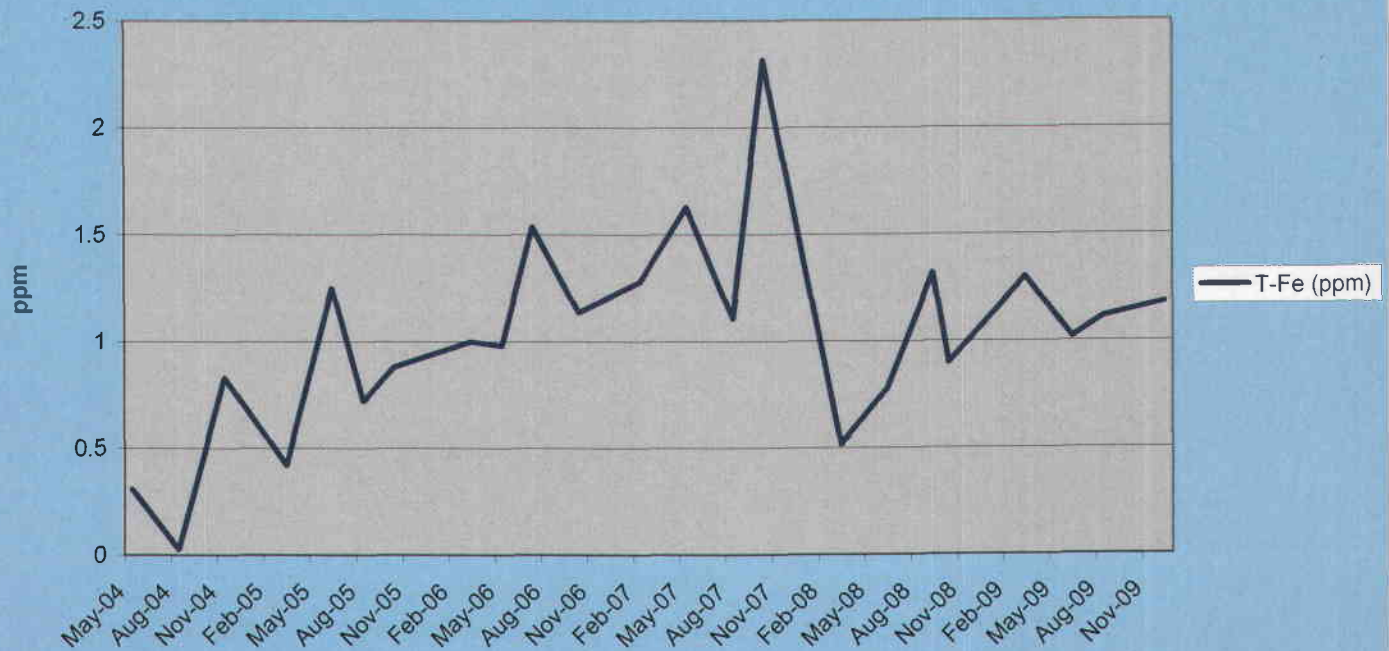
ST-5: T-Fe vs. Time



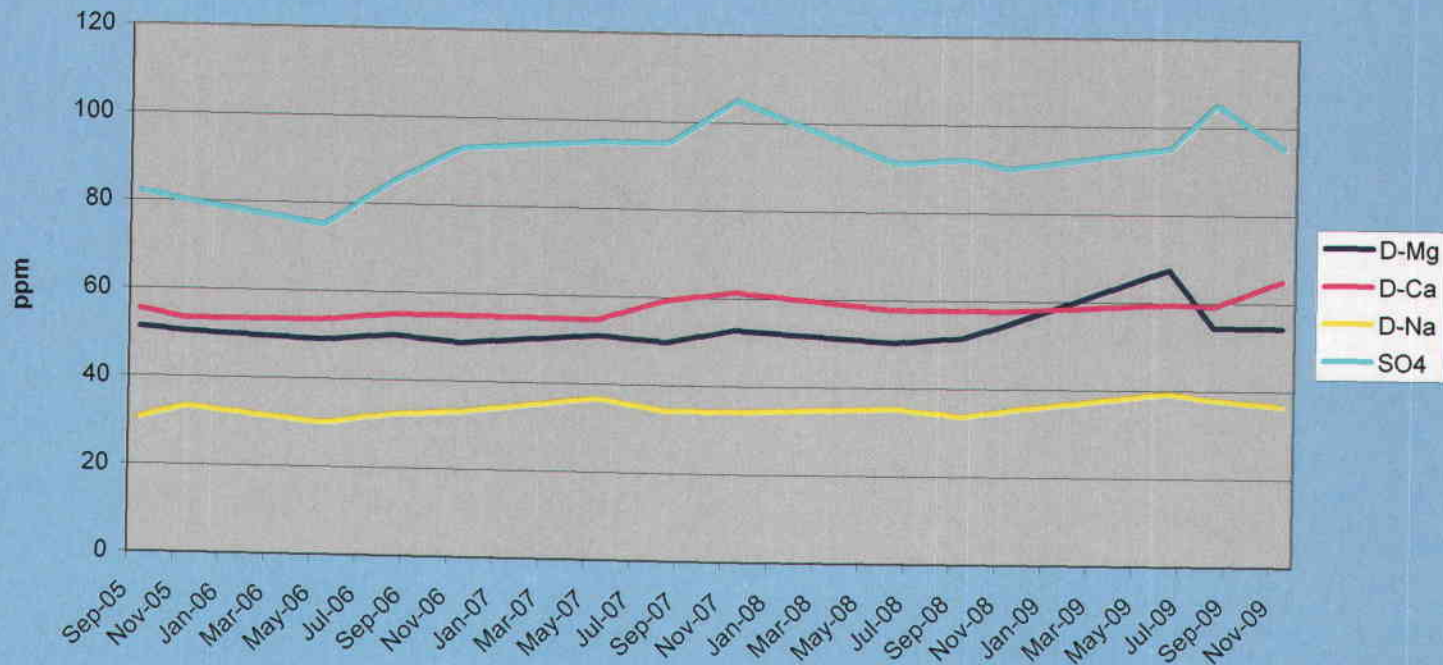
ST-6: TSS vs. Time



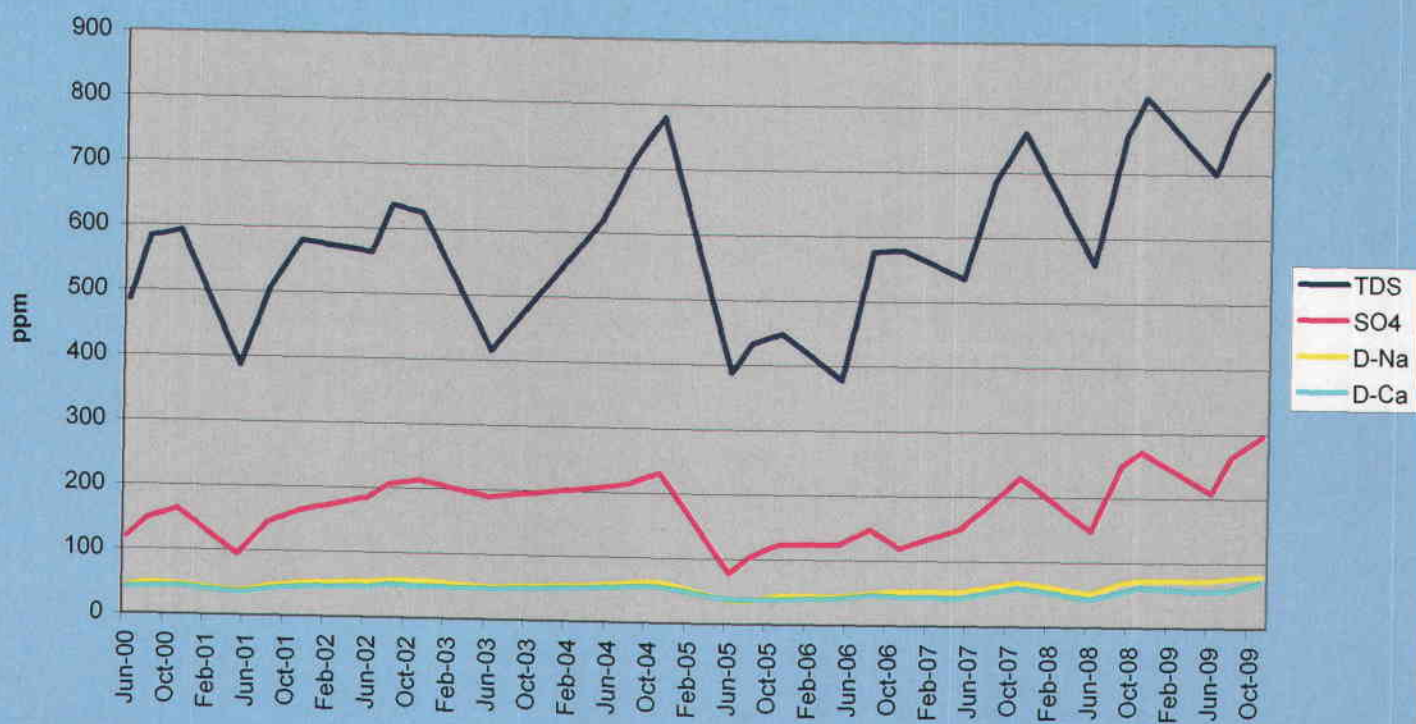
ST-6: T-Fe vs. Time



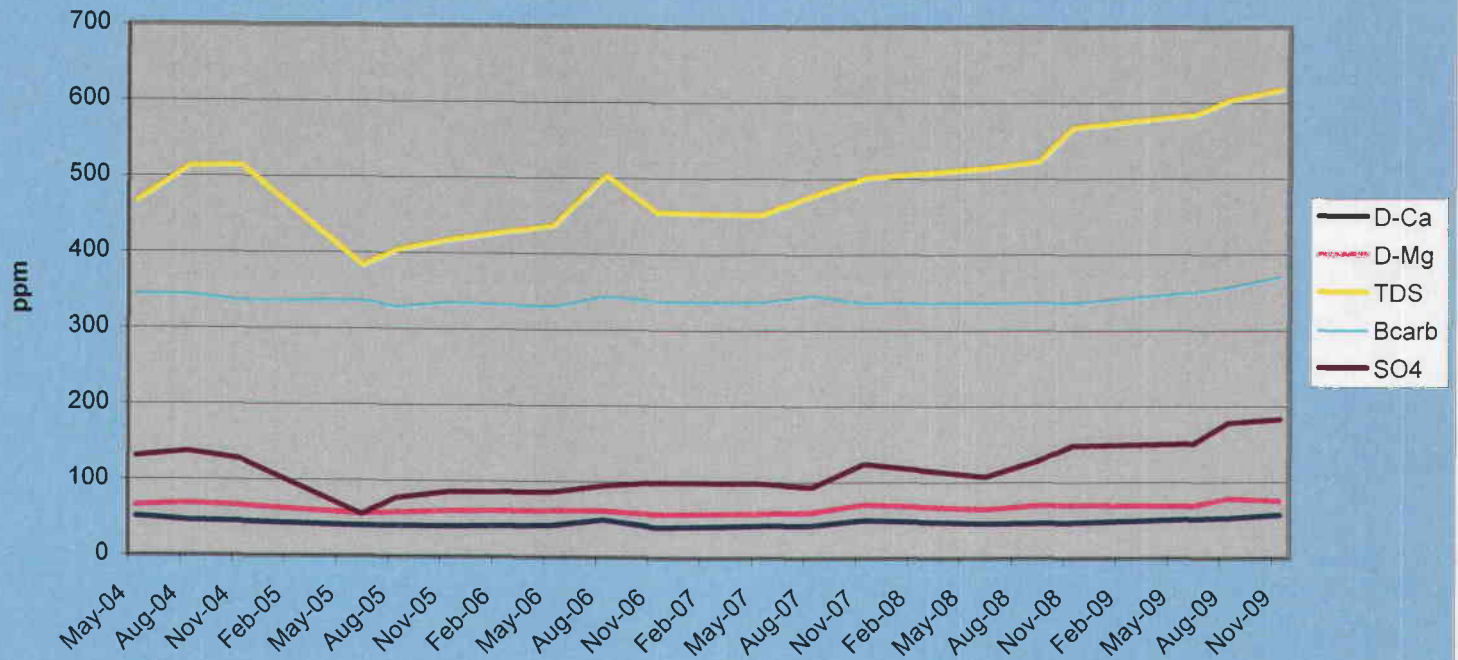
Spring SP-101



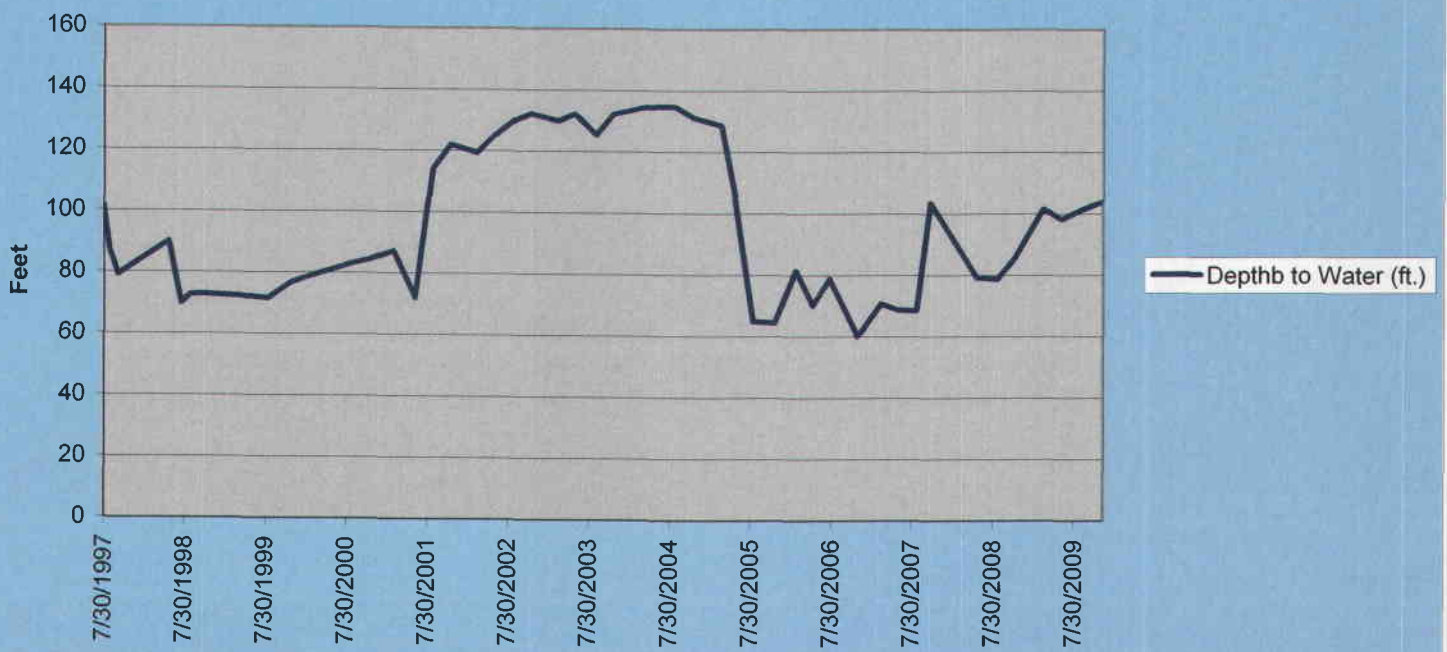
Spring SP-13



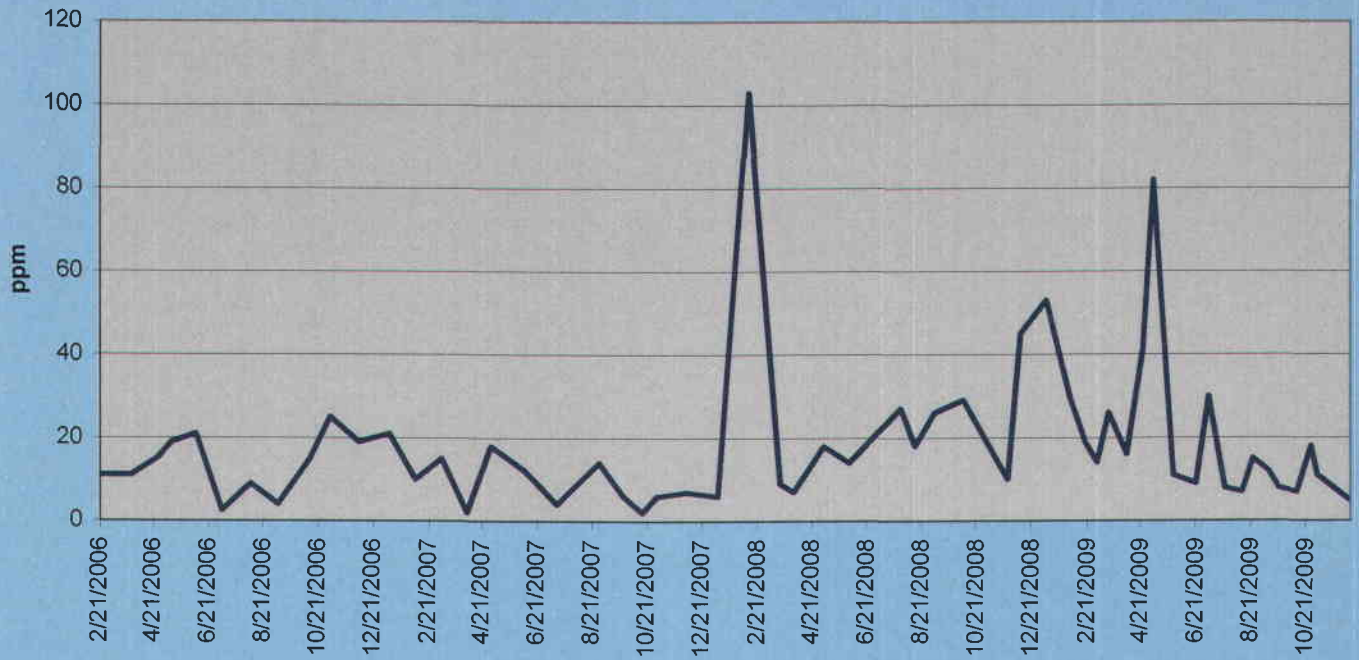
Spring SP-12



Well DH 86-2



UPDES Outfall D002: TSS vs. Time



UPDES Outfall D002: Total Iron (T-Fe) vs. Time

